

Tackling Keynes' question: a look back on 15 years of Learning To Consume

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Abstract Two centuries of continuous economic growth since the industrial revolution have fundamentally transformed consumer lifestyles. Here Keynes raised an important question: will consumption always continue to expand in the same manner as it has in the previous two centuries? If so, how? This paper critically reviews a body of work that has adopted the Learning To Consume (LTC) approach to study the long run growth of consumption (Witt 2001). By borrowing certain established insights from psychology and biology about how consumers learn and what motivates them to consume, it highlights how rising income, new technologies and market competition have combined to trigger important changes in both the underlying set of needs possessed by consumers and how they learn to satisfy these needs. Methodological issues and open questions are discussed.

Keywords Demand growth · Consumer learning · Needs · Endogenous preferences

JEL Classifications D11 · D01 · E21 · 033

1 Introduction

Two centuries of continuous economic growth since the industrial revolution have fundamentally transformed consumer lifestyles in Western economies and raised living standards (Lebergott 1993; De Vries 2008). As John Maynard Keynes (1933) noted in the “Economic Possibilities of our Grandchildren”, such rapid progress raises an

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important question: will consumption always continue to expand in the same manner as it has in the previous two centuries? If so, how? Most contemporary macroeconomic models of growth typically do not consider how economic growth influences the composition of household demand and assume that any extra income generated by increases in the productive capacity will be converted into increases in demand ad infinitum (Stiglitz 2008). In contrast, Keynes –following other scholars preceding him (i.e. Menger 1871)– considered the nature of the underlying needs that motivate consumption and how rising affluence may impact their satisfaction. He conjectured that there are two types of needs: absolute and relative needs. Absolute needs are satiable and Keynes argued that within a hundred years, these needs would be sufficiently satisfied to the extent that further energies could be devoted to non-economic purposes (Keynes 1933; Pecchi and Piga 2008). However, relative needs are insatiable because their satisfaction is linked to a desire for superiority over others.

This paper critically reviews a body of work that has adopted the Learning To Consume (LTC) approach to study the long run growth of consumption (Witt 2001; Witt 2016, Witt in this issue). By borrowing certain established insights from psychology and biology about how consumers learn and what motivates them to consume, this body of work aims to provide a more contemporary answer to Keynes' original question. It delivers some insights into the various behavioral forces driving the long run expansion of consumption expenditure and how this process is in some ways intrinsically linked to rising social affluence and technological progress. In the existing Evolutionary Economics literature, it has already been noted how consumer learning processes can play a critical role in various aspects of economic evolution. For example, models of structural change emphasize highlight how the industrial composition of economies can respond to changes in the household composition of demand (Metcalfe et al. 2006; Bertola et al. 2006; Saviotti and Pyka 2008; Ciarli et al. 2010). They also play a role in the formation of niche markets and the degree of demand heterogeneity faced by industries (Malerba et al. 2007; Guerzoni 2010). Multi-agent models of consumer learning further highlight how they influence market dynamics (Aversi et al. 1999; Babutsidze 2011; Valente 2012). A comprehensive account of long run economic growth must consider both the character and speed at which household preferences evolve as household income grows.

Beyond growth, the LTC approach is also relevant to the ongoing question of how to promote the rapid and voluntary adoption of more environmentally sustainable (and less carbon intensive) forms of consumption (Dietz et al. 2009, Woersdorfer and Kaus 2011; Witt 2011). A crucial issue here is to uncover the causes of path dependency in consumption patterns, i.e. why are consumption patterns 'locked-in' (Røpke 1999, 2009; O'Hara and Stagl 2002)? Some potential answers to this issue can be found in the LTC studies that have sought to identify the social, technological and economic conditions in which consumers rapidly accumulate knowledge in a particular consumption domain and actively modify the consumption acts to suit their refined preferences.

The paper is structured as follows. Section 2 summarizes the LTC approach and describes the various types of needs that drive consumption. Section 3 reviews emerging themes in the body of work that has adopted the LTC approach. Section 4 discusses the various factors from these studies that accelerate the accumulation of consumer knowledge. Section 5 critically discusses the methodological benefits and pitfalls of this approach and briefly considers the implications for achieving more sustainable forms of consumption. Section 6 concludes.

2 Learning To Consume

The goal of the LTC approach is to study the underlying process by which consumer preferences are formed. Standard microeconomic models assume preferences are given and fixed. Consumers already know what they want and do not need to learn about which goods will deliver them utility (Stigler and Becker 1977; Swann 2002). Yet to properly explain the long run growth of consumer spending it is vital to consider how consumers come to discover which goods and services are useful in the first place (Menger 1871; Ruprecht 2002). LTC tackles this challenge by borrowing key insights from biology and psychology about what motivates human behavior and how they learn. These insights support Keynes' conjecture that not all 'needs' are the same. There are important differences in terms of how universally shared they are across a population of consumers, how stable they are over time, and the extent to which social environs may shape them.¹ This section will categorize 'needs' into three subtypes: innate needs (fixed, universally shared), acquired wants (subject to slow change, not universally shared) and cognitive motives (subject to fast changes, not universally shared).

2.1 Innate needs

Innate needs are fixed and universally shared by agents due to human biological evolution. They are triggered by hedonic sensations (pleasure and pain) which have evolved to guide behavior and enhance the probability survival (Rolls 2005; Damasio 2003). These sensations guide behavior by encouraging (rewarding) or discouraging (punishing) the behavior that elicit these sensations. Table 1 provides some examples of 'primary reinforcers', which have been experimentally shown to deliver somatic value and thereby encourage or discourage associated behavior.

Some, but not all, of these sensations are related to internal homeostatic mechanisms that require organisms to regularly consume inputs in order to ensure survival. This includes the need for a stable temperature, adequate amounts of water, sleep, nutrition, oxygen, and so on. Lades (2013) models the extent to which an innate need i motivates consumption in category j as:

$$v(\theta_{i,t}, p_{i,t} \cdot c_{i,t}) = f(\theta_{i,t} - p_{i,t} \cdot c_{i,t})$$

Where $\theta_{i,t}$ is the level of expenditure required to achieve complete satiation of need i , $p_{i,t} \cdot c_{i,t}$ represents expenditure on the goods as a product of prices $p_{i,t}$ and quantities $c_{i,t}$. The need deprivation level is thereby defined as the difference between the level required for complete satiation and the current level of expenditure, $p_{i,t} \cdot c_{i,t}$.² Lades develops a demand functions for goods in which demand is dependent on the relative deprivation of the need and the usual budget constraint (Lades 2013:1022).

¹ The view that needs are dynamic and heterogeneous across a population of consumers also distinguishes this approach from other needs approaches found in the social sciences (i.e. Maslow 1943; Max-Neef 1991).

² Note that it is assumed that each need precisely corresponds to one expenditure category. Thus j is not present in the formula, since $i=j$.

Table 1 Some primary reinforcers (source Rolls 2005:19)

Reinforcer	Effect
Salt taste	Reward in cases of salt deficiency
Sweet	Reward in cases of energy deficiency
Bitter	Punisher, indicator of possible poison
Sour	Punisher
Putrefying odour	Punisher; hazard to health
Pheromones	Reward (depending on hormonal state)
Pain	Punisher
Touch	Reward
Temperature	Reward if tends to help maintain normal body temperature
Crying infant	Punisher to parents
Novel stimuli	Rewards
Sleep	Reward; minimizes nutritional requirements
Group acceptance	Reward
Breathing	Reward

This formulation enables one to consider how rising income can trigger changes in the composition of demand by enabling consumers to reach $\theta_{i,t}$ for certain needs. Similar to Keynes' notion of relative needs, both Cordes (2009) and Lades (2013) suggest that for certain socially-orientated needs, rising income can influence $\theta_{i,t}$ such that affluent consumers are driven to consume more in order to attain social esteem (see *inter alia* Scitovsky 1976; Frank 1985; Hopkins and Kornienko 2004). Thus the amount of expenditure needed to satisfy such needs will grow as the average household income rises.

2.2 Acquired wants

Another type of consumption need is generated in the learning process that is the general process by which a species adapts to change and behavior is modified in response to environmental stimuli (McFarland 1987:2). LTC recognizes the presence of two types of learning, non-cognitive and cognitive learning, that are linked to acquired wants and cognitive motives, respectively.³ Non-cognitive learning that describes the classical conditioning process (Skinner 1953). An important feature of this process is that the set of stimuli which deliver reinforcement can themselves also change with experience. Specifically, secondary reinforcers are formerly neutral stimuli whose repeated pairing with primary reinforcers results in them exerting a reinforcing effect in their own right (Anderson 2000:39). For example, if a consumer is repeatedly exposed to a certain type of bed sheet when they sleep (a reinforcer, see Table 1), they

³ These learning modes coexist because the enlargement of human brain capacity did not evolve in a way in which there was a smooth substitution of more advanced learning mechanisms for more primitive ones (Flinn 1997:33, Sartorius 2003). Rather, development was sticky: more advanced mechanisms emerged to complement older mechanisms. This presence of two learning systems is also recognized in dual process theory (Gigerenzer et al. 1999; Kahneman 2003).

may acquire a liking for such bed sheets that exists independently of how tired they are. In this way a range of ‘acquired wants’ are likely to emerge as consumers experience reinforcement and accumulate associations between these experiences and the material environment which surrounds them. These acquired wants will be neither universally shared nor fixed across a population of consumers due to differences in each agent’s material environment and the types of reinforcement to which they have been exposed, these acquired wants will be neither universally shared nor fixed across a population of consumers. It is possible to construct a taxonomy of goods according to the type of reinforcement to which they were originally associated (Alhadeff 1982:16, Foxall et al. 2004). Many advertising strategies are based on encouraging consumers to want goods by forming associations between products and reinforcement (Stuart et al. 1987). Through this process consumers can thereby acquire likes and dislikes that are unique to their particular learning history. Lades (2014) elaborates on how acquired wants may be linked to impulsive consumption behavior (see also Laibson 2001; Bernheim and Rangel 2004).

2.3 Cognitive motives

A final type of need is related to cognitive learning by consumers. In contrast to non-cognitive learning, cognitive learning typically describes a problem-solving sequence in which consumers deliberate and use their imagination to find new solutions to a given problem (Earl 1986). Outcomes depend on the creative capacity of agents to access socially available information, analyze open-ended situations, gain insights and find appropriate courses of action (Hergenhahn and Olson 1997:263). In many instances consumers develop strategies for consumption that are based on developing complementarities between different consumption domains and their identity (Earl 1986, 1998). This process helps create demand for ‘higher order’ goods that do not directly satisfy innate needs, but are instead used as inputs into a transformation process for the production of final goods (Menger 1871; Ruprecht 2002; Cordes 2005). For example, an innate need is the avoidance of pain, such as that caused by an illness (see Table 1). As scientific knowledge has generated new socially available knowledge about human illnesses and how they may be avoided, the consumer’s knowledge of what constitutes a healthy lifestyle has dramatically transformed and now affects a variety of different consumption activities, including what agents eat, where they live and what clothes they wear (Mokyr 2000). Witt (2001) posits that another source of consumption growth is the increasing degree of scientific and cultural knowledge and the number of higher order goods that agents can utilize in satisfying their needs. This type of demand is not subject to satiation and is discussed further in Section 4.

3 Emerging themes

The literature adopting the LTC approach consists of both historical case studies and empirical studies. Table 2 reports a small sample of the case studies to illustrate how it covers a wide range of consumption domains including nondurable foodstuffs (food and alcohol), manufactured durables (washing machines and shoes expenditure) and services (recreational travel services). One overarching theme present in these studies is

that the long run growth rate of consumption in any one particular domain is rarely ever linear (Kindleberger 1989). Rather, consumption growth tends to occur in a discontinuous fashion that features periods of intense acceleration mixed together with gradual slowdowns in consumer spending. While some of this volatility may reflect changes in income growth and supply conditions, demand side factors also contribute towards shaping phases of accelerations and slowdowns. Some of these factors are detailed as follows.

3.1 Demand satiation

One prominent theme is that demand growth for certain goods closely related to the satisfaction of innate needs is subject to periodic slowdowns. ‘Demand satiation’ is when per capita quantity consumption of a good (with a fixed set of characteristics) ceases to rise beyond a particular level even as household income continues to grow and the good’s production costs good tends to fall. This implies $\theta_{i,t} - p_{i,t} \cdot c_{i,t} = 0$ and represents a growth bottleneck (Pasinetti 1981). The key point made by many of these case studies is that these slowdowns in per capita demand reflect changes in individual preferences that take place precisely because the underlying needs that originally motivated demand growth have been satiated. As a result of demand satiation, markets may potentially stagnate as further gains in income tend to be redirected towards the satisfaction of other needs. This contributes to fostering a market environment in which product innovations emerge (as will be discussed below).⁴

The most prominent example of demand satiation is the case of food consumption used to satisfy the need for hunger (Ruprecht 2005; Manig 2010). Amongst the world’s poorest, food spending typically represents over half of total household expenditure (Banerjee and Duflo 2007). As households become more affluent, it has been widely observed that their budget share spending on food tends to decline as household income grows (Clements and Chen 1996; Chai and Moneta 2010). In a case study of the growing demand for food sweeteners among Western economies, Ruprecht (2005) highlights how per capita sugar consumption, measured in terms of calories consumed, is typically subject to strong slowdowns in the 20th century. Throughout the Western developed world, the consumption of sweeteners did not rise above 1000 calories per capita per day. This slowdown took place even though household income grew substantially and the actual price of sugar consistently fell throughout the 20th century. Ruprecht argues that this slowdown reflects the fact that as growing income enabled households to consume more calories, this also contributed to satiation in the growth of calorie demand. This is a good example of how the evolved biological nature of humans that has shaped human needs has important implications for the growth rate and structure of economic systems, which have emerged to serve these needs.

Moneta and Manig (2014) provide more evidence for satiation in food consumption. In their cross sectional empirical investigation of contemporary Russian food spending patterns, the authors examine the relationship between calorie consumption and income

⁴ Several other scholars have noted the important role that critical thresholds in the consumer’s demand for certain characteristics play in industry evolution (Lancaster 1971; Adner and Levinthal 2001; Windrum 2005).

Table 2 Some historical case studies employing the LTC approach

Author	Good	Need	Demand satiation (Section 3.1)	Satiation escape (Section 3.2)	Non-cognitive learning (Section 2.2)	Specialisation (Section 4)
Years						
Ruprecht 2002	Food Sweeteners 1800 -present	Hunger, arousal and health	Satiation identified in the consumption of sugar in post-war US and German markets	Artificial sweeteners emerged as a low-calorie substitute for sugar, enabling further growth in overall consumption of sweetness. Shifts in satiation level thought to be linked to the growth of food varieties as consumers tend to consume more food if eaten together with other types of food.	Sweetness is a genetic reinforcer and was used by producers to realize economies of scale by increasing sugar content across a variety of foods. As consumers become more affluent, eating for the sake of arousal has superseded the original motive of eating for the sake of avoiding hunger.	Social norms concerning health helped create the demand for artificial sweeteners. Evidence suggests that Nutritional information about food seems to have little impact on how much consumer's decide to eat
Manig and Moneta 2009	Food 1990-2000	Hunger, arousal	Recent Russian food expenditure data shows evidence of satiation in the quantity of certain foods types consumed.			
Frenzel Baudisch 2006	Footwear 1960- 1991	Social recognition, comfort	Satiation identified in the post-war US and German market with respect to consumers demand for comfortable footwear	Satiation drove a separation of process and product innovation in structure of footwear industry in order to achieve economies of scale and scope	As consumers become more affluent, wearing shoes for the sake of status signalling superseded the original motive of wearing shoes for the sake of maintaining comfort	Changing social structure drove changes in how consumer undertook social comparisons & shoe consumption
Woersdorfer 2009	Washing machines 1850s -present	Social recognition, Health, drudgery avoidance	Satiation is found to be present in the current US and German consumption of washing machines.	Current satiation levels washing machine consumption is determined by the socially acceptable standard of cleanliness	The want for drudgery avoidance, health and social recognition, rather than demand for time savings, motivated the adoption of washing machines by low income consumers.	The social norms of cleanliness played an important role driving consumer's adoption of washing machines
Chai 2007	Tourism Services 1800 -present	Arousal, Health	No instances of satiation identified.	Urbanisation of domestic environments caused holidays 'away' from cities to be reinforcing, leading to emergence of resort tourism in 19th century	the habituation effect plays an important role in mediating what types of recreational activities consumer engage in, and the rate at which seek exposure to new travel destinations	New communication technologies triggered historic changes in consumer learning patterns, driving demand for remote locations

(see *inter alia* Bouis and Haddad 1992). Moneta and Manig (2014) find that average calories consumed per person in the household per week tends to flatten out at about 2857 calories per day. After reaching this level, their results indicate that increasing income appears to stimulate close to no increases in average calories consumed. It should be noted that while average household calorie consumption is flat, there is substantial variation around this average. This suggests that some households do in fact continue to increase their calorie consumption well beyond the average satiation level.⁵

Is satiation observed among other types of goods besides food? Several case studies confirm the existence of demand satiation in a wide range of goods that satisfy a diverse set of needs including spending on alcohol (Volland 2012), washing machines (Woersdorfer 2010a) and shoes (Frenzel Baudisch 2006). Each of these studies identify periods in which the characteristics of the goods in question were relatively stable and demand growth was very slow in spite of both falling prices and rising household incomes. For example, Frenzel Baudisch (2006) examined U.S. shoe spending between 1955 and 2002 and found strong evidence that footwear spending exhibited satiation between 1955 and 1970. Although footwear spending accelerated quickly after 1970s, this was preceded by a prolonged period in which the growth of spending on footwear was relatively stagnant. In this period, demand satiation occurred at a spending level where the average consumer purchased about three pairs of shoes per year. The budget share of footwear spending was declining, which implies that footwear was a necessity – rather than a luxury good. The author reasoned that the slowdown in the growth rate of demand was due to functional satiation (Frenzel Baudisch 2006). It was only after the 1970s that shoes were used to signal status and more specialized types of shoes, such as athletic shoes, started to be consumed *en masse* by U.S. households (discussed in the next section).

Other studies have sought empirical evidence for the satiation hypothesis by investigating the shape of Engel curves using data on household expenditure (Kaus 2013a; Moneta and Chai 2014; Moneta and Chai 2014; see also Bruns and Moneta in this issue). It should be noted that some of the expenditure categories used here tend to be aggregated across goods with different characteristics. Moreover, the demand satiation hypothesis describes slowdowns in the *quantity* of goods consumed, whilst real expenditure data reflects both changes in relative prices and quantities consumed. In spite of this, several of the empirical findings appear to support the conjectures made in some case studies. For example, consistent with Ruprecht's finding of satiation in sugar consumption, the Engel curve for sugar expenditure among British households displays a clear downward trend and a tendency to become flatter between 1974 and 2001 (see Fig. 1 below). This implies that the income elasticity for sugar is trending towards zero over time. Similarly, flat Engel curves that exhibit downward trends over time have been revealed for several food items such as beef, milk, tobacco and fish (Moneta and Chai 2014). Examining an even broader range of expenditure categories, they also found that such flat and stable Engel curves (consistent with the satiation

⁵ In addition, note that making inferences about individual behaviour from such Engel curves assumes that the aggregation process does not substantially influence the shape of Engel curves. Many other factors may influence the shape of Engel curves, such as how consumers change the manner in which they learn from their peers as they become more affluent (Cordes 2009).

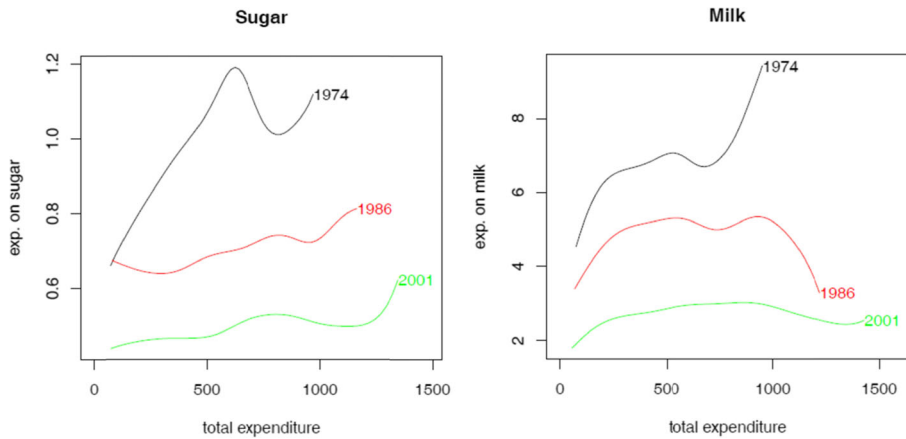


Fig. 1 Non-parametrically estimated Engel curves for sugar and milk for the UK (source Chai and Moneta 2014, Moneta and Chai 2014)

hypothesis) tend to be more pronounced in goods, but much less prevalent in services. This finding that demand satiation is more prevalent in goods is consistent with existing stylized facts that rising household income is positively correlated with a reduction in the share of consumer spending on goods and an increase in the share of consumer spending dedicated to services (Herrendorf et al. 2013; Boppart 2014).

As a result, demand satiation does not take place consistently across all consumption domains. Several markets exhibit exponential growth rates where no evidence for demand satiation is found. Demand satiation is less frequent in markets that:

- i) Serve needs that are difficult to satiate (e.g. status goods)
- ii) Feature frequent product innovations (e.g. radio and television)
- iii) Are related to services (discussed above).

Concerning point i), Cordes (2009) and Lades (2013) suggest that for certain socially-oriented needs, rising income can influence $\theta_{i,t}$ such that affluent consumers are driven to consume more in order to attain social esteem (see *inter alia* Frank 1985; Hopkins and Kornienko 2004). Thus, as income rises and social peers become affluent, so too does the amount of expenditure needed to satisfy these needs (Charles et al. 2009; Kaus 2013a). Point ii) above is supported by findings in Moneta and Chai (2014, see Fig. 2) and Bills and Klenow (2001b).

3.2 Escaping satiation

If demand satiation is present in some markets, how can these slowdowns be overcome, if at all? A second theme of the LTC studies is that the ongoing formation and reformation of connections between goods and the needs can trigger renewed phases of accelerated demand growth. As a consequence of this process, the functional nature of goods – which can be defined as mapping between needs and goods & their characteristics – may be subject to change as entrepreneurs search for new profit

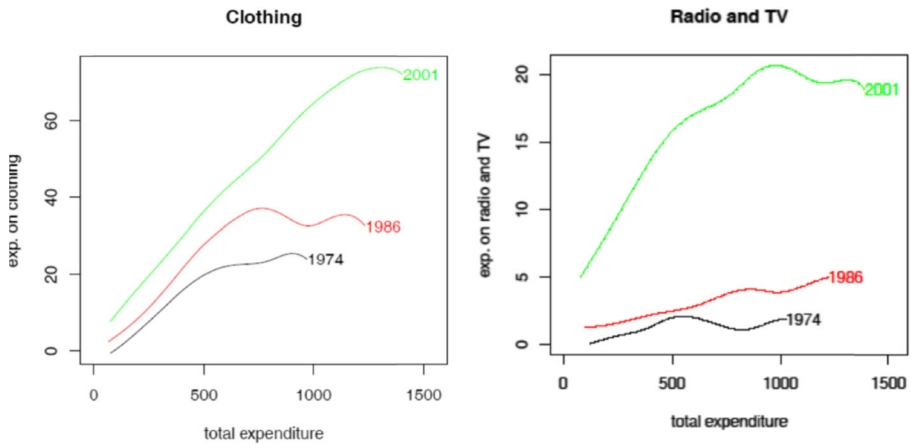


Fig. 2 Non-parametrically estimated Engel curves for clothing and radio & television for the UK (source: Moneta and Chai 2014)

opportunities and consumers acquire new motives and knowledge from their experiences. We highlight below three factors that were identified as playing some role in the formation of these new connections between goods and needs.

Firstly, short run consumer learning patterns can stimulate rapid consumption growth when consumers creatively discover new connections between their needs and goods. In some instances, this growth may emerge even when no supply side product innovation has taken place and the physical characteristics of the good have remained constant. We dub these “functional mutations”. For example, in the case of U.S. shoe consumption (Frenzel Baudisch 2006), the 1980s witnessed a remarkable acceleration in per capita shoe spending that coincided with the variety of shoes available on the market. Frenzel Baudisch argues this occurred because a shoe was no longer perceived as just a shoe: these goods were no longer consumed merely for the sake of comfort. Rather, consumers began to use them as a way to signal their social status to other consumers. As reflected in Run DMC’s 1986 successful single “My Adidas”, athletic shoes began to be used by urban U.S. youths to signal their group affiliation (Cunningham 2008). A shoe turned into a communication device which helped consumers signal to others information about the individual’s identity and values. As a result, U.S. household spending on shoes experienced renewed growth and the number of registered trademarks related to shoes also grew. Another case that features short run consumer learning is the adaption of bicycles that were formerly used for transport and recreation (Buenstorf 2003). Consumers actively modified the characteristics of bicycles to better suit their own needs. Far from being random events, such short run consumer learning dynamics highlight the importance of taking into account the knowledge base of consumers and their propensity to innovatively use goods (Bianchi 1998, Hippel 2005). This issue is discussed further in Section 4.

A second demand side factor is the long run shifts in the type of needs driving expenditure. Many recognized that the underlying needs that drive consumption are subject to significant changes as consumers become more affluent (Scitovsky 1976; Lebergott 1993, Frank 1999, Witt 2001). A shrinking proportion of household spending is dedicated to the satisfaction of innate needs that are easier to satiate (such as hunger)

while an increasing proportion of spending is dedicated to goods related to harder to satiate needs, such as social status, the demand for novelty and cognitive health concerns. Thus, a possible avenue for overcoming demand satiation and slow demand growth is for entrepreneurs to modify the characteristics of the goods such that they appeal to needs that are not yet satiated (Witt 2001). Witt and Wörsdorfer (2011) find that the characteristics of washing machines initially designed to deliver clean clothes were later modified to reduce the time and physical effort required to undertake washing. Chai (2007) discusses how the characteristics of British inland and seaside resorts that were initially based on Roman medical doctrines to treat serious illnesses slowly evolved between the 17th and 19th centuries to appeal to the need for novel stimuli (see Table 1) via entrepreneurial effort manifested in the construction of new entertainment infrastructure such as pleasure piers, promenading areas, and theatres (Walton 2000:95). Preliminary empirical evidence for the satiation-escape conjecture was found by studying the co-movement the satiation level of Engel curves and average household income (Moneta and Chai 2014).

In relation to food consumption, several studies have pointed out that in spite of slowdowns in the quantity of food consumption, total spending on food nevertheless continues to rise with income. Ruprecht (2005) showed that by replacing sugar in food with newly developed artificial sweeteners, food producers reduced the calorie contents of food that appealed to consumers' growing concerns about their personal health and body weight. Manig (2010) further argue that one underlying factor for this is that food consumption is an activity that has increasingly come to be associated with other motivations beyond the need for nourishment. Increasingly affluent consumers tend to no longer eat food just because they are hungry, but because they enjoy the novelty of exotic ingredients that food can deliver. This may account for why the demand for variety in food has grown (Thiele and Weiss 2003). Hence demand continues to grow as goods and their characteristics evolve to appeal to a wider set of needs.

Third, these studies also highlighted how market institutions foster satiation escape by facilitating the formation of new connections between needs and goods. Through markets, consumers come to discover new goods and ways to satisfy their needs, while producers discover how their goods may be too complicated to use or may not serve the consumer needs or their broader lifestyle (Earl 1986; Swedberg 1994; Loasby 1999; Langlois 2001; Potts 2001). This is typically reflected in the messages producers send to consumers via advertisements that highlight the benefits of their products. For example, in the case of washing machine advertisements, these messages have changed in character to educate consumer about new characteristics highlight how the washing machine can satisfy a wider set of needs (Witt and Wörsdorfer 2011).

This underlines the observation that markets are not mechanisms for exchange, but also a type of social tool that facilitates interaction between consumers & producers and helps coordinate expectations, behavior and knowledge accumulation across these groups on either side of the market (Potts 2001; Langlois 2001). The character of market competition is thus to some extent influenced by what consumers know and the needs they seek to satisfy. More knowledgeable consumers seek greater control in using products as they modify the consumption acts to better suit their own unique set of needs. Hence, the type of product innovations present in markets serving knowledgeable consumers tend to be 'performance-orientated' in that they deliver more control to

the consumer such that they can tailor the final consumption act (Chai 2011). For example, Scitovsky (1976) gives the example of sports cars that have acquired more gears, more gauges, more lights, differential locks, and other attributes that are designed to give the driver more control over the vehicle, but at the same time may require more driving skill, which may prove aversive to non-specialized consumers (Scitovsky 1976:273). Another example is cameras, which have become much more performance orientated as a substantial segment of consumers have accumulated knowledge about cameras and seek more technical control in the act of taking a picture (Windrum 2005).

In other instances, where consumers possess relatively little knowledge, market competition and product innovations may tend to be ‘convenience orientated’, as goods evolve to better appeal to a wider range of needs and consumer lifestyles. Product innovations in such markets aim to reduce the cognitive effort in the consumption act (Bianchi 2002, Saviotti 2002:122). The effort to make goods and services more convenient and easier to use may involve introducing new product characteristics that satisfy a wider set of needs. For example, pre-cooked frozen meals available in supermarkets. Whilst in the past these saved consumer’s time and effort in not having to cook, a new generation of such meals emerged in the 1990s, designed to be more “healthy” in that they contain fewer calories and less fat. Not only is the consumer hunger satisfied, but their concern for being healthy is also addressed. In contrast to performance-orientated competition, functional change is more geared toward improving the convenience of goods and how efficaciously they fit into the consumer’s lifestyle.

4 Consumer specialization

Understanding precisely what determines the degree to which consumers learn and accumulate knowledge is a topical issue in Evolutionary Economics (e.g. Babutsidze 2011; Valente 2012). LTC posits that the presence of acquired wants may influence cognitive learning since consumers tend to collect information and develop highly differentiated knowledge about the technological and aesthetic details of things they like (Witt 2001:35). Moreover, cognitive learning may also influence non-cognitive learning as consumer knowledge may enable consumers to enjoy new experiences through which acquired wants may emerge (Witt 2001:36). This dynamic interaction between learning modes can result in a specialization process through which both their knowledge and preferences become more refined. Some cognitive concerns that have been studied in the case studies include concerns about obesity (Ruprecht 2005; Manig 2010), environmental concerns (Buenstorf and Cordes 2008; Woersdorfer and Kaus 2011) and the desire for a consistent self-image (Lades 2014).

Here a crucial question that was not covered tackled in the original LTC framework is what social, economic and cognitive factors may accelerate or inhibit the rate at which consumers accumulate knowledge and develop preferences in a particular consumption domain. The LTC studies highlight a number of such factors:

- I. Social availability of knowledge: the ability of agents to store and access information aids cognitive learning (Flinn 1997:36, Mokyr 2002). Technological

breakthroughs such as the invention of the printing press, radio, television, and the internet have with little doubt fostered specialization processes and the emergence of new consumer subcultures (DeFleur and Ball-Rokeach 1989:26, Buenstorf 2003).

- II. Social norms & experts: Consumer learning is guided by the social rules and conventions surrounding how knowledge is accepted and legitimized (McCloskey and Klamer 1995; Mokyr 2002). Social experts feature prominently here, especially in consumption domains in which goods are increasingly complex (i.e. credence goods) (Earl and Potts 2004, Dulleck and Kerschbamer 2006). Their advice can actively encourage or discourage consumer learning. For example, Ruprecht (2005) highlights how nutritionists promoted greater awareness of the unhealthy consequences of sugar consumption, which encouraged consumers to adopt artificial sweeteners. Similarly, public information campaigns encouraged consumers to use washing machines (Mokyr 2000; Woersdorfer 2010b) and discouraged alcohol consumption in post-war Germany (Volland 2012). Woersdorfer (2010a) studied the evolving demand for cleanliness in clothing and the home environment in Western economies and found that it was not the outcome of individual learning but rather strongly governed by social norms which determined the extent to which agents sought clean clothing and home environments. As these social norms evolved, so too did the consumer demand for clean materials and tools (Woersdorfer 2010b).⁶
- III. Modularity of goods: The extent to which consumers may experiment and customize goods encourages cognitive learning (Langlois and Cosgel 1998, Langlois 2001). For example, a crucial role was played by the modularity of goods during the invention of the mountain bike in the early 1970s (Buenstorf 2003). This good emerged from the ability of expert consumers to modify and change some design features of the mountain bike, including frame geometry, gearshift with thumb shifters and cantilever brakes (see also Hippel 2005).

In terms of its character, specialized demand may be relatively less stable than demand motivated by innate needs. Compared to traditional industries such as agriculture which primarily serves innate needs, industries that serve cognitive concerns are thought to be relatively less stable as the use of the goods is based on knowledge that may be rendered obsolete by the ongoing emergence of new scientific knowledge. A good example of this is the 16th and 17th century British resort industry that was originally based on the Roman medical paradigm in which certain elements found in the natural environment could be used for the treatment of serious illnesses. Much of this paradigm was rendered obsolete with the emergence of modern medicine and hospitals located in urban areas (Chai 2007).

Another feature specialized demand is its heterogeneous nature. The types of cognitive concerns possessed by individuals are uniquely dependent on their own

⁶ Elsewhere, the acquisition of preferences is also shaped by families and the socialization process (Volland 2013) and the availability of (non-working) time (Chai et al. 2015).

history of experiences and cultural influences. The growing prominence of such demand could account for the increasingly indeterminate household spending patterns, as demonstrated by the well-established positive relationship between income and the observed heterogeneity in spending patterns (Lewbel 2008). Houthakker (1992) argues that the tendency for heterogeneity in household spending to increase at higher income levels reflects the growing amount of discretionary power that emerges when innate needs are satisfied. Others have also pointed out that the growth of demand heterogeneity may also help account for the rising demand for services (Gallouj and Weinstein 1997). One particular function of services is that they customize lower order goods in accordance with the consumer specific preferences (Hipp and Grupp 2005). For example, a travel agent is used to customize the features of a holiday. As such, the predominance of the services sector in developed economies could be driven by the growth of customization and knowledge-based demand.

5 Discussion

5.1 Future directions

A central theme in Evolutionary Economics is to develop a more realistic account of learning and knowledge accumulation by agents, firms and industries (Nelsan and Winter 1982; Dopfer et al. 2004). On the demand side, this implies developing new ground in understanding how consumer tastes are neither fixed nor homogenous. Rather, tastes seem subject to change according to what consumers learn (Nelson and Consoli 2010) and are open to the influences of social and commercial environments (Aversi et al. 1999; Babutsidze 2011; Valente 2012). As Schumpeter himself recognized, understanding the precise magnitude and nature of how such external influences shape consumer tastes ultimately delivers important insights into how market-based capitalist economies grow in a self-perpetuating fashion (Jonsson 1994).

Here the LTC studies underline how a key determinant of the rate at which demand evolves is the extent to which consumers are learning in a cognitive or non-cognitive fashion. In most studies of consumer behavior it is assumed that consumers are either learning in one or the other, but not both. Few studies consider the possibility that both modes of learning may coexist. Doing so enables scholars to consider what events and conditions, such as the emergence of new goods, may trigger switches in consumer learning modes (Brenner 1999; Buenstorf and Cordes 2008).⁷ The presence of two learning modes may thereby help explain why consumers display relatively passive, routine driven behavior in some circumstances (Nelson and Consoli 2010), but act in a highly creative and innovative manner in other instances (Bianchi 2002).⁸ Further studying how switches between cognitive and non-cognitive learning modes take place

⁷ The key to progress on this issue is to recognize that different modes of behavior coexist (e.g. Hayek 1960; Gigerenzer et al. 1999; Witt 2001; Kahneman 2003) and to identify how agents may transition between modes and the different circumstances in which these modes tend to dominate (Brenner 1999; Lades 2014).

⁸ This also has implications for welfare economics (see Sartorius 2003; Binder 2010; Schubert 2012).

may also be useful in developing effective policy that encourages consumers to rethink their entrenched consumption habits (discussed below).

Beyond the individual level, another theme in evolutionary economics is how the heterogeneous nature of demand and niche markets can play a critical role in industry evolution (Saviotti 1996; Bresnahan and Gambardella 1998; Lipsey et al. 2005; Guerzoni 2010; Malerba et al. 2007). The LTC studies show there are several different sources of demand heterogeneity. In a given population of consumers, heterogeneity in demand may be driven by differences in i) what consumers know, ii) the type of acquired wants & cognitive motives they possess iii) the connection between goods and the underlying needs they serve. It is worth noting that the focus on the evolving connection between goods and needs (Section 3.2) bears some similarity with the recent discussion of ‘disruptive innovations’ that emphasizes how functional change of goods can have major implications for industry structure (Christensen 1997; Baudisch 2007; Markides 2006). Differentiating between these sources of demand heterogeneity thereby helps deliver a better understanding of when and how industries can foster the emergence of niche markets (Buenstorf 2003; Babutsidze 2011).

On the macro level, the industrial composition of the economy tends to undergo important structural changes that can affect unemployment, growth and the income distribution. Many scholars posit that the non-homothetic nature of consumer demand co-determines the direction of structural change (see *inter alia* Pasinetti 1981; Aoki and Yoshikawa 2002; Metcalfe et al. 2006; Bertola et al. 2006; Saviotti and Pyka 2008; Ciarli et al. 2010). Here, the LTC studies provide a behavioral account for observed differences in income elasticities across goods produced by different industries (Cordes 2009; Lades 2013; Kaus 2013b; Moneta and Chai 2014). These studies help explain why some markets experience demand satiation. Another interesting question for future work is to examine whether the responsiveness of the industrial composition to final demand is growing as specialized demand is becoming an increasingly prominent component of household spending.

5.2 Methodological issues

Adopting the LTC approach has some clear drawbacks. Firstly, due to an inability to directly measure the influence of needs on behavior, it is not possible to know with full certainty which needs motivate a particular act of consumption. Conclusions can only be reached through developing informed conjectures based on scientific knowledge about the nature of need and carefully studying the behavior of consumers. More effort needs to be made to develop an empirical methodology that can uncover the underlying forces driving observed expenditure patterns (see for example Barigozzi and Moneta 2011; Chai and Moneta 2012).

Second, the case studies show that many characteristics of needs are highly domain-specific in nature. This raises the question as to the possibility of making generalizations about needs that apply to all consumption domains. Food consumption, for example, is linked to an internal homeostatic mechanism where calories are periodically required to preserve the basic functioning of the human organism. The same cannot be said for other innate needs, such as the need for novel stimuli (see Table 1). This need can also be satisfied by eating and drinking and its temporal ability to

motivate consumption to some degree also depends on how deprived other needs are (Parker and Tavassoli 2000). However, the need for food does not depend on how deprived consumers are of novel stimuli. These issues reflect an inevitable tradeoff between generalizability and realism in the sense that scholars forego making generalizable statement that hold for a wide range of phenomena when constructing more realistic explanations that rest on detailed scientific knowledge about the biological foundations of human behavior.

Third, compared to existing neoclassical consumer theory, the LTC approach is less tractable. Even when scholars thoroughly investigate all primary historical sources and market data, it is difficult to discern between the influences of cognitive and non-cognitive learning processes cognitive rather than non-cognitive learning processes. Moreover, much of this needs-based approach rests on., the ability to identify the relationship between goods and the needs that they serve rests on current scientific knowledge about the nature of needs and the consumer's learning patterns. As far as this scientific knowledge about needs is itself fallible and subject to change, so too are the theories based upon this knowledge.

5.3 Endogeneity and the sustainability agenda

The LTC studies have highlighted a number of different ways in which demand is 'endogenous' in the sense that it has been influenced by economic conditions and market institutions (Bowles 1998). First, due to the satiable nature of (some) innate needs, rising household income has enabled a major shift in the composition of demand away from the satisfaction of innate needs. Second, new technologies and institutions for storing and sharing information (including markets) have enhanced the cognitive learning process and the rise of knowledge-based demand. This type of demand is more volatile in nature, and is likely to be more heterogeneous than demand related to the satisfaction of innate needs. Third, it is likely that producer advertising has contributed towards the generation of acquired wants via non-cognitive learning in which products are repeatedly associated with appealing primary reinforcers such as images of very attractive people. The experimental evidence makes it hard not to conclude that suppliers, under certain conditions, possess some capacity to generate acquired wants that motivate spending (Stuart et al. 1987). This capacity is nevertheless limited by the fact that acquired wants are subject to extinction over time and the manner in which they motivate behavior is complex (Berridge et al. 2009).

In terms of the sustainability agenda (Jackson 2006), it may be tempting to conclude that because of this endogenous influence, consumption patterns are unlikely to change significantly in the future. A general pessimism pervades the literature about the extent to which sustainable consumption patterns will emerge (Norton et al. 1998). Current consumption patterns appear to be 'locked in' for a range of reasons, including social norms (Røpke 1999; Sanne 2002) and individual habits (Maréchal 2010). At the same time, much evidence suggests that most people are strongly concerned about climate change and the environmental impact of consumption (Nisbet and Myers 2007). There appears to be a yawning gap between these concerns and the consumer's propensity to *act* on these concerns by adopting sustainable consumption practices (Gifford et al. 2011). While this gap between

stated environmental concerns and actual consumption behavior could be a reflection of ‘cheap talk’, it could also be the case that consumers do not possess the knowledge to act appropriately on their environmental concerns (Gifford et al. 2011). This can be done through public information campaigns. However, information alone may not be enough to trigger consumers to specialize and actively modify their behavior in a particular consumption domain (as discussed Section 4). Beyond providing information, another approach could be to foster the broader epistemic, social and economic conditions that encourage consumers to cognitively learn about how to act on their environmental concerns.

6 Conclusion

Returning to Keynes’ question, a proper explanation of the long run growth of demand must go beyond merely assuming that consumer demand is homogenous and insatiable. Rather it must consider, as Keynes himself did, the underlying needs driving consumption and how these may evolve in the long run. The LTC studies make it clear that the continuous expansion of demand is not an inevitable occurrence. Rather, it is the result of how individuals have adapted to tremendous changes in their economic, social and technological surroundings. It is also a reflection of how economic conditions and social institutions have influenced both the type of needs that motivate consumers, as well as enhanced the capacity of consumers to learn about how to satisfy their needs. Hence, the extent to which demand will continue to grow also depends on how much further future these can continue to shape demand by further enhancing the accumulation of consumer knowledge, promoting the generation of acquired wants and directing more spending towards needs that are insatiable.

Many open questions for future research still remain. An appropriate empirical approach to identifying the underlying connection between goods and the needs they serve is lacking and could deliver greater insight into how the satiation of needs stimulate product innovation and the emergence of new goods. The notion of acquired wants and how these are subject to growth and extinction has thus far attracted little attention even though non-cognitive learning is widely acknowledged to be an important tool for advertising. Finally, more work could be done on formalizing the important differences about how needs motivate consumption. If economists are interested in answering Keynes’ question, a closer look at the nature of what motivates consumption is unavoidable.

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